

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
4 May 2006 (04.05.2006)

PCT

(10) International Publication Number
WO 2006/046094 A1

(51) International Patent Classification⁷: **F41A 3/58**

(21) International Application Number:
PCT/IB2005/001177

(22) International Filing Date: 25 April 2005 (25.04.2005)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
BO2004A000663 25 October 2004 (25.10.2004) IT

(71) Applicant (for all designated States except US): **DEBO S.R.L.** [IT/IT]; Via Saliceto, 9/F, I-40128 Bologna (IT).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **DE GREGORIO, Vito** [IT/IT]; Via del Borgo di San Pietro, 132, I-40126 Bologna (IT).

(74) Agents: **BIANCIARDI, Ezio** et al.; Bugnion S.p.A., Via Goito, 18, I-40126 Bologna (IT).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

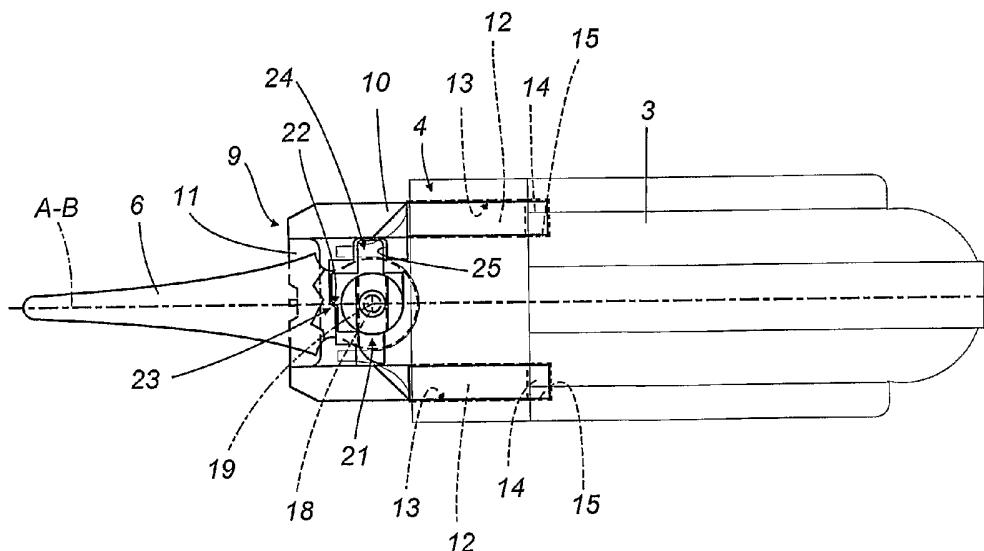
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A DEVICE FOR OPENING AND CLOSING ROLLING BLOCK FIREARMS



(57) Abstract: An opening and closing device (9), associated with the rolling block (4) and receiver (3) of a hunting or sports gun, comprises a key (6) that is hinged by a tube (18) to the upper part of the rolling block (4), and a bolt (10) that is actuated by a shaped end (21) of the key (6) and is slidably mounted on the rolling block (4) in such a way that it can be moved from a retracted, open position in which the bolt (10) is entirely inside the rolling block (4), and an advanced, closed position in which the bolt (10) protrudes from the front of the rolling block (4) with two arms (12) designed to lock by friction two matching mortises (15) made in the receiver (3); the arms (12) extend from the ends of a shoulder (11) of the bolt (10) and the shaped end (21) of the key (6) has a first cam (22) designed to exert a pushing action to the central portion of the shoulder (11) in order to disengage the arms (12) from the mortises (15).

WO 2006/046094 A1

DescriptionA device for opening and closing rolling block firearmsTechnical Field

The present invention relates to a device for opening and closing rolling block firearms.

5 In the sector of portable firearms, a rolling block firearm is one in which a receiver that supports the barrel (or barrels) is hinged to a central block, called rolling block, that houses the firing mechanisms. Reciprocal rotation of the receiver and the rolling block makes it possible to open the firearm so that it can be manually loaded.

10 This specification refers in particular, but without restricting the scope of the invention, to rolling block shoulder firearms, especially hunting and sports guns which, as is known, have an opening and closing device comprising a bolt operated by a key located at the top of the rolling block.

15

Background Art

In a known type of rolling block firearm, the bolt is housed in the rolling block and has two tenons which project from the front of the block and which, when the block is closed, fit snugly into two mortises made in the receiver that supports the barrel (or barrels).

20 Turning the key towards the open position makes the bolt slide back towards the gun stock, thus disengaging the tenons from the mortises and causing them to move back into the rolling block.

25 The coupling between the key and the bolt is made by an eccentric tooth that fits into a socket made in one side of the bolt. This type of coupling requires of the gun user a relatively high critical release moment to overcome the friction between receiver and bolt when the latter is in the closed position.

30 To obtain an acceptable value for the critical release

moment, firearm manufacturers, when designing a firearm, tend to reduce the overall coupling surface between mortises and tenons. This, however, causes unwanted slipping between the receiver and the bolt every time a shot is fired. This slipping causes wear on the mortises and tenons which, in the long run, leads to slack and vibrations. To compensate for the wear, the two tenons are made longer so that, when a gun is new, they do not enter the mortises completely and go in further and further over time, as they gradually wear.

Obviously, wear compensation of this type is possible until such time as the tenons go into the mortises as far as possible. Once this limit has been reached, the gun requires maintenance which is very expensive.

In addition to this drawback, compensation for wear as just described causes the closing position of the key to drift, eventually leading to its misalignment with respect to the line of sight and disturbing the shooter's aim. To avoid this, shoulder firearms are normally manufactured in such a way that the key in a new gun is shifted to the right of the line of sight and tends to come into line with it as the tenons and mortises wear.

The present invention has for an object to provide a device for opening and closing rolling block firearms that overcomes the above mentioned drawbacks.

According to the invention, this object is achieved by a device for opening and closing rolling block firearms having the characteristics described in claim 1.

The claims dependent on claim 1 refer to advantageous preferred embodiments of the invention.

Brief Description of the Drawings

A preferred, non-restricting embodiment of the invention provided purely by way of example is described below with reference to the accompanying drawings, in which:

Figure 1 shows a hammerless, over and under hunting gun comprising an opening and closing device according to the present invention;

Figure 2 shows a detail of the gun of Figure 1, with some

parts in cross section and others cut away;

Figure 3 is a perspective view of the detail of Figure 2;

Figures 4 to 6 illustrate three positions of the opening and closing device according to the present invention;

5 Figure 7 is a scaled-up view of a detail from Figure 4;

Figure 8 is a perspective view of another detail of the gun of Figure 1;

Figure 9 shows another embodiment of the detail illustrated in Figure 7.

10

Detailed Description of the Preferred Embodiments of the Invention

The reference numeral 1 in Figure 1 denotes in its entirety a hammerless hunting gun with over and under barrels 2.

15 The barrels 2 are rigidly mounted on a receiver 3, which is hinged to a central unit, known as rolling block 4, of the gun 1 by means of a pin 5.

The pin 5, once the gun 1 is unlocked using a lever of an opening key 6 located on the upper part of the rolling block 4, allows the receiver 3 and the barrels 2 to be turned with respect
20 to the rolling block 4. Thus, when the gun is open, the position of the barrels 2 is such that cartridge cases can be removed and new cartridges loaded (Figure 6).

The receiver 3 may be attached to the barrels 2 in various ways: for example, it may be fastened mechanically or welded or it
25 may be made as a single piece with the barrels.

On the side opposite the receiver 3, the rolling block 4, which houses the firing mechanism, which is not described in detail here since it is of well known type, rigidly supports a
gunstock 7 with a frame 8.

30 As shown in Figures 2 to 6, the key 6 forms part of a device 9 used to open and close the gun 1 and comprising a bolt 10 actuated by the key 6 and housed inside the rolling block 4 just under the latter's upper part.

The bolt 10, shown in detail in Figure 7, is U-shaped and
35 has two arms 12 positioned symmetrically about a central plane A of the bolt 10 itself and extending perpendicularly, and on the same side, from the two ends of a shoulder 11.

The shoulder 11 of the bolt 10 faces the gunstock 7, whilst the arms 12 extend towards the barrels 2 in a direction parallel with the barrels 2, with the plane A coinciding with a plane B of substantial longitudinal symmetry of the gun 1.

5 The bolt 10 is slidably coupled with the rolling block 4 and, more specifically, its arms 12 are inserted in respective through holes 13 in the rolling block 4 and protrude from the front of the block to form two respective tenons 14 when the bolt 10 is in the closed position (Figures 2, 4, 8).

10 In the advanced, closed position, the tenons 14 are inserted fully home into, and fit snugly in, two matching mortises 15 made in the receiver 3 outside the shank of the upper barrel 2, whilst in the retracted, open position (Figure 6) the tenons 14 are housed entirely inside the holes 13.

15 The bolt 10 is locked in the closed position by elastic means, consisting in this particular instance of a helical spring 16 of the device 9 (Figures 2, 3, 7) that presses against the shoulder 11 on the side opposite the arms 12 and is positioned between the shoulder 11 and an abutment 17 forming part of the rolling block 4 and fixed under the latter's upper part.

20 When a shot is fired, the spring 16 allows the bolt 10 to slide back relative to the rolling block 4 and then to follow the movement of the receiver 3, without letting the tenons 14 and mortises 15 slip, thereby avoiding the damage that such slipping would cause.

25 The bolt 10 can be retracted to the open position by manually pulling the lever of the key 6 to overcome the opposing action of the spring 16. Figure 4 shows the key 6 in the closed position, with the lever perfectly aligned with the line of sight, whilst Figures 5 and 6 show the key 6 in an intermediate open position and in a fully open position, respectively. As may be inferred from Figures 4, 5 and 6, the bolt 10 is opened by turning the key 6 to the right of the line of sight, that is to say, by turning the key 6 anticlockwise in Figures 4, 5 and 6.

30 As can be seen better in Figure 2, the key 6 is hinged to the rolling block 4 by a tube 18 allowing it to rotate about an axis 19 orthogonal to the plane in which the bolt 10 lies and

lying in the plane A.

The end of the tube 18 positioned inside the rolling block 4 close to the bolt 10 is pressure fitted in a central socket 20 in a wheel 21.

5 The wheel 21 is positioned in the same plane as the bolt 10, between the two arms 12 and against the shoulder 11, and is peripherally equipped with a first cam 22 designed to act in conjunction with a central protrusion 23 on the shoulder 11 to impart to the bolt 10 a first translational movement towards the
10 gunstock 7.

The wheel 21 also has a second cam 24 designed to act in conjunction with a hollow 25 in the arm 12 on the left-hand side of the line of sight to impart to the bolt 10 a second translational movement towards the gunstock 7.

15 The wheel 21 may be attached to the tube 18 not only by pressure fitting but also in various other ways: for example, it may be made as a single piece with the tube. Whatever the case, the wheel 21, with its two cams 22 and 24, constitutes one end of the shaped key 6 to drive the bolt 10.

20 The first cam 22, the second cam 24, the protrusion 23 and the hollow 25 are positioned and shaped in such a way that, as the bolt 10 moves from the closed position to the open position, first the protrusion 23 is engaged by the first cam 22 and then the hollow 25 is engaged by the second cam 24.

25 In the positions illustrated in Figures 4 and 7, where the key 6 is in the closed position, the cams 22 and 24 are separated by a small gap from the protrusion 23 and from the hollow 25, respectively. The bolt 10 is therefore disengaged from the key 6 and held against the mortises 15 of the receiver 3 by the spring
30 16.

When the key 6 lever is turned a little way to the right (Figure 5) the cam 22 comes into contact with the protrusion 23 and pushes it towards the gunstock 7, thus causing the bolt 10 to move back a little. At this stage, in which the cam 24 remains
35 separated from the hollow 25, the disengagement force F1 applied centrally to the bolt 10 by the shooter using the key 6 -wheel 21 assembly overcomes the friction between the tenons 14 and the

mortises 15, as well as the opposing force of the spring 16, thereby disengaging the bolt 10 and the receiver 3.

The cam 22 and the respective protrusion 23 thus constitute means for disengaging the bolt 10.

5 Turning the key 6 lever further to the right (Figure 6) brings the cam 24 into contact with the hollow 25, thereby moving the bolt 10 all the way back. At this stage, the sideways driving force F2 applied to the bolt 10 by the shooter using the key 6 - wheel 21 assembly again overcomes the opposing force of the spring
10 16.

As may be inferred from the above description, the forces F1 and F2 are both relatively moderate. In particular, the disengagement force F1 is relatively low compared to the size of the contact surfaces between tenons 14 and mortises 15 since it
15 acts centrally on the bolt 10.

It should be noticed, with reference to Figure 7, that between the hollow 25 and the respective cam 24 there is a certain amount of clearance, defined by the gaps 26 and 27 which not only enable the bolt 10 to be positioned in the fully closed position
20 without acting on the key 6, but also allows the bolt 10 itself to be disengaged during the initial rotation of the key by a just a few degrees. Indeed, during the initial rotation, only the cam 22 and the protrusion 23 come into contact since the cam 24 moves in the gap 27 without coming into contact with the respective wall of
25 the hollow 25.

The gap 26 allows the key 6 to move to the end of its stroke (zero position) without acting on the bolt 10.

The end-of-stroke position is defined by a limit block 28, whilst a spring 29 acting between an arm 30, extending from the
30 wheel 21 diametrically opposite the cam 24, and the rolling block 4 enables the key 6 to move to its zero position.

It should be noticed that when the cam 22 comes into contact with the protrusion 23, the disengagement force F1 applied centrally to the bolt 10 presents a first vector component F1u in
35 the direction of the line of sight and oriented towards the gunstock 7, and a second vector component F1t, orthogonal to the line of sight and oriented towards the arm 12 on the right of the

line of sight. The vector component F_{1u} imparts to the bolt 10 the aforementioned backward translational movement towards the gunstock 7, whilst the vector component F_{1t} constrains the bolt 10 transversely in unbalanced manner.

5 Figure 9 shows another embodiment of the opening and closing device 9 as described above but in which the shoulder 11 of the bolt 10 does not have the protrusion 23. In this embodiment, the protrusion 23 is substituted by the arm 31 of an L-shaped lever 32 hinged to the upper part of the rolling block 4 by a pin 35 so
10 that it rotates about an axis 33 parallel to the aforementioned axis 19.

 When the bolt 10 is in the advanced, closed position (Figure 9), the lever 32 is housed in the vicinity of the corner of the bolt 10 between the shoulder 11 and the arm 12 on the right of the
15 line of sight, with the arm 31 facing the shoulder 11 and the other arm 34, which is coupled with the pin 35, facing the arm 12. In this position the arms 31 and 34 are separated from the shoulder 11 and from the arm 12, respectively.

 When the key 6 lever is turned a little way towards the open
20 position of the bolt 10, the disengagement force F_1 makes the lever 32 turn - in an anticlockwise direction in Figure 9 - and causes the bolt 10 to be pushed centrally back by the arm 31. In other words, the pushing action on the central portion of the shoulder 11 is applied by the cam 22 in this case too, but
25 indirectly through the lever 32 which acts as a passive element.

 Obviously, in this case, the vector component F_{1u} is applied centrally to the shoulder 11 through the arm 31, whilst the vector component F_{1t} is discharged directly on the rolling block 4 through the pin 35, preventing unwanted jamming and deformation of
30 the bolt 10.

 As in the first embodiment described above, the first cam 22, the second cam 24, the lever 32 and the hollow 25 are positioned and shaped in such a way that, as the bolt 10 moves from the advanced, closed position to the retracted, open
35 position, first the arm 31 of the lever 32 is engaged by the first cam 22 and then, after the arm 31 has been pushed by the shoulder 11, the hollow 25 is engaged by the second cam 24.

The opening and closing device 9 as described above therefore:

5 - permits a secure end coupling between the receiver 3 and the rolling block 4, while allowing the shooter to open the gun 1 with relatively little effort;

- substantially eliminates slipping between the tenons 14 and the mortises 15;

10 - significantly reduces wear on the tenons 14 and the mortises 15;

- permits optimum positioning of the key 6 lever which, when the bolt 10 is in the advanced, closed position, is exactly aligned with the line of sight and does not drift from this position.

15 It will be understood that the invention as described above with reference to the gun 1 may also be applied to a generic rolling block firearm such as, for example, a hunting or sports gun with a single barrel, with side-by-side barrels (double gun) or with three barrels (drilling).

Claims

1. An opening and closing device for rolling block firearms comprising a rolling block (4), at least one barrel (2) and a receiver (3), the latter being attached to the barrel (2) and hinged to the rolling block (4); the device (9) being associated
5 with the rolling block (4) and receiver (3) so as to allow reciprocal rotation of the rolling block (4) and of the receiver (3) to open and reciprocal end locking between the rolling block (4) and the receiver (3) to close; the device (9) comprising a key (6) that is hinged by a tube (18) to the upper part of the rolling
10 block (4), and a bolt (10) that is actuated by a shaped end (21) of the key (6) and is slidably mounted on the rolling block (4) in such a way that it can be moved from a retracted, open position in which the bolt (10) is entirely inside the rolling block (4), and an advanced, closed position in which the bolt (10) protrudes from
15 the front of the rolling block (4) with two arms (12) designed to lock by friction two matching mortises (15) made in the receiver (3); the arms (12) extending from the ends of a shoulder (11) of the bolt (10); the device being characterised in that the shaped end (21) of the key (6) has a first cam (22) designed to exert a
20 pushing action on the central portion of the shoulder (11) in order to disengage the arms (12) from the mortises (15).
2. The device according to claim 1, characterised in that the first cam (22) acts in conjunction with a central protrusion (23) on the shoulder (11) so as to disengage the arms (12) from the
25 mortises (15).
3. An opening and closing device for rolling block firearms comprising a rolling block (4), at least one barrel (2) and a receiver (3), the latter being attached to the barrel (2) and hinged to the rolling block (4); the device (9) being associated
30 with the rolling block (4) and receiver (3) so as to allow reciprocal rotation of the rolling block (4) and of the receiver (3) to open and reciprocal end locking between the rolling block (4) and the receiver (3) to close; the device (9) comprising a key (6) that is hinged by a tube (18) to the upper part of the rolling
35 block (4), and a bolt (10) that is actuated by a shaped end (21)

of the key (6) and is slidably mounted on the rolling block (4) in such a way that it can be moved from a retracted, open position in which the bolt (10) is entirely inside the rolling block (4), and an advanced, closed position in which the bolt (10) protrudes from the front of the rolling block (4) with two arms (12) designed to lock by friction two matching mortises (15) made in the receiver (3); the arms (12) extending from the ends of a shoulder (11) of the bolt (10); the device being characterised in that the shaped end (21) of the key (6) has a first cam (22) designed to act in conjunction with a central protrusion of the shoulder (11) in order to disengage the arms (12) from the mortises (15).

4. The device according to claim 2 or 3, characterised in that the shaped end (21) of the key (6) has a second cam (24) designed to act in conjunction with a hollow (25) in one of the arms (12) in order to move the bolt (10) to the retracted, open position.

5. The device according to claim 4, characterised in that the first and the second cam (22, 24), the protrusion (23) and the hollow (25) are positioned and shaped in such a way that, as the bolt (10) moves from the advanced, closed position to the retracted, open position, first the protrusion (23) is engaged by the first cam (22) and then the hollow (25) is engaged by the second cam (24).

6. The device according to any of the foregoing claims from 2 to 5, characterised in that it comprises elastic means (16) acting on the bolt (10) in such a way as to keep the bolt (10) in the advanced, closed position.

7. The device according to claim 6, characterised in that the elastic means (16) consist of a helical spring (16) that presses against the shoulder (11) of the bolt (10) on the side opposite the arms (12) and is positioned between the shoulder (11) and an abutment (17) forming part of the rolling block (4).

8. The device according to any of the foregoing claims from 2 to 7, characterised in that the key (6) has a manual actuating lever that is aligned with the line of sight when the bolt (10) is in the advanced, closed position.

9. A rolling block firearm, in particular a hunting or sports gun, characterised in that it comprises an opening and closing device according to any of the foregoing claims from 2 to 8.
10. The device according to claim 1, characterised in that the
5 first cam (22) acts in conjunction with a lever (32) hinged to the rolling block (4) so that the pushing action is exerted on the shoulder (11) through the lever (32).
11. The device according to claim 10, characterised in that the
10 lever (32) is L-shaped and has a first arm (31) facing the shoulder (11) and a second arm (34) hinged to the rolling block (4) and facing one of the arms (12); the pushing action on the central portion of the shoulder (11) being exerted through the first arm (31).
12. The device according to claim 10 or 11, characterised in that
15 when the bolt (10) is in the advanced, closed position, the lever (32) is housed in the vicinity of the corner of the bolt (10) between the shoulder (11) and one of the arms (12).
13. The device according to any of the foregoing claims from 10
20 to 12, characterised in that the shaped end (21) of the key (6) has a second cam (24) designed to act in conjunction with a hollow (25) in one of the arms (12) in order to move the bolt (10) to the retracted, open position.
14. The device according to claim 13, characterised in that the
25 first and the second cam (22, 24), the lever (32) and the hollow (25) are positioned and shaped in such a way that, as the bolt (10) moves from the advanced, closed position to the retracted, open position, first the lever (32) is engaged by the first cam (22) and then the hollow (25) is engaged by the second cam (24).
15. The device according to any of the foregoing claims from 10
30 to 14, characterised in that it comprises elastic means (16) acting on the bolt (10) in such a way as to keep the bolt (10) in the advanced, closed position.
16. The device according to claim 15, characterised in that the
35 elastic means (16) consist of a helical spring (16) that presses against the shoulder (11) of the bolt (10) on the side opposite the arms (12) and is positioned between the shoulder (11) and an abutment (17) forming part of the rolling block (4).

17. The device according to any of the foregoing claims from 10 to 16, characterised in that the key (6) has a manual actuating lever that is aligned with the line of sight when the bolt (10) is in the advanced, closed position.
- 5 18. A rolling block firearm, in particular a hunting or sports gun, characterised in that it comprises an opening and closing device according to any of the foregoing claims from 10 to 17.

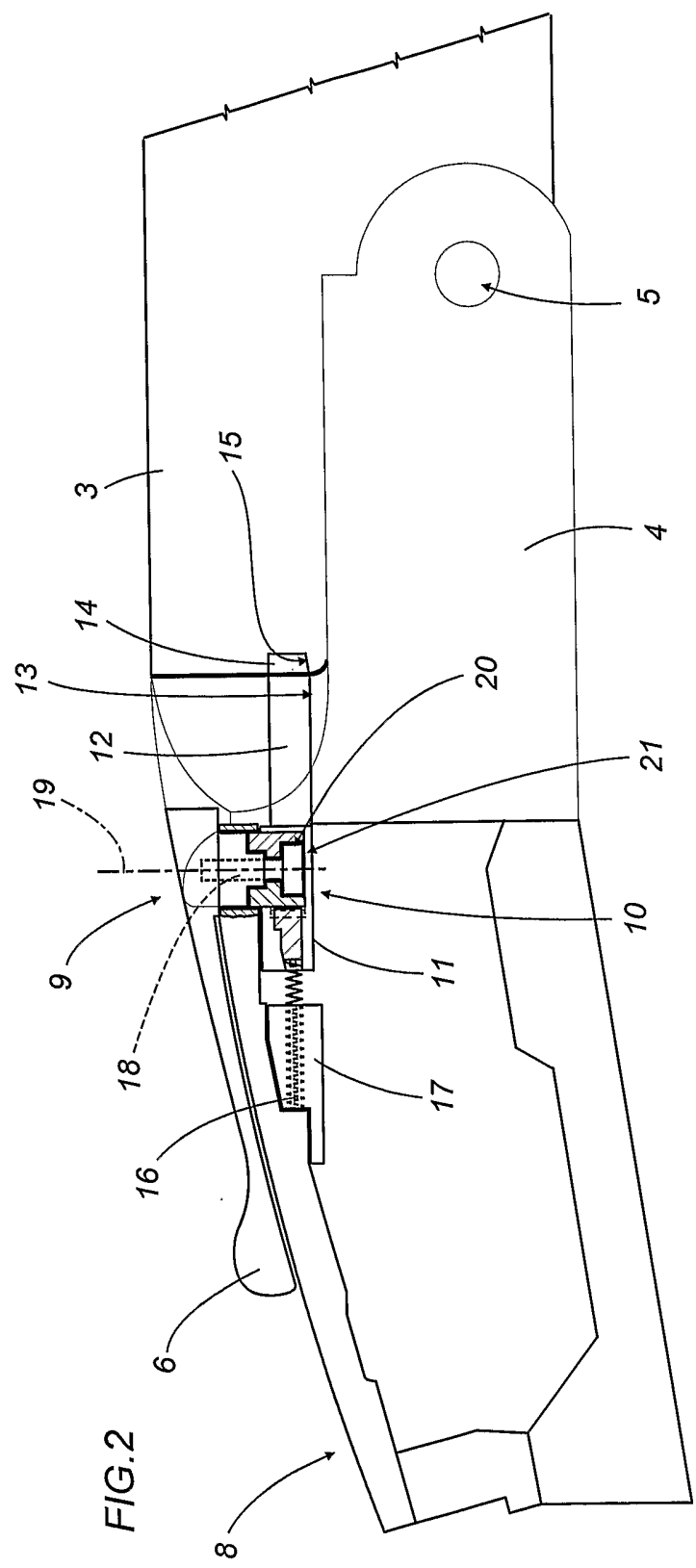
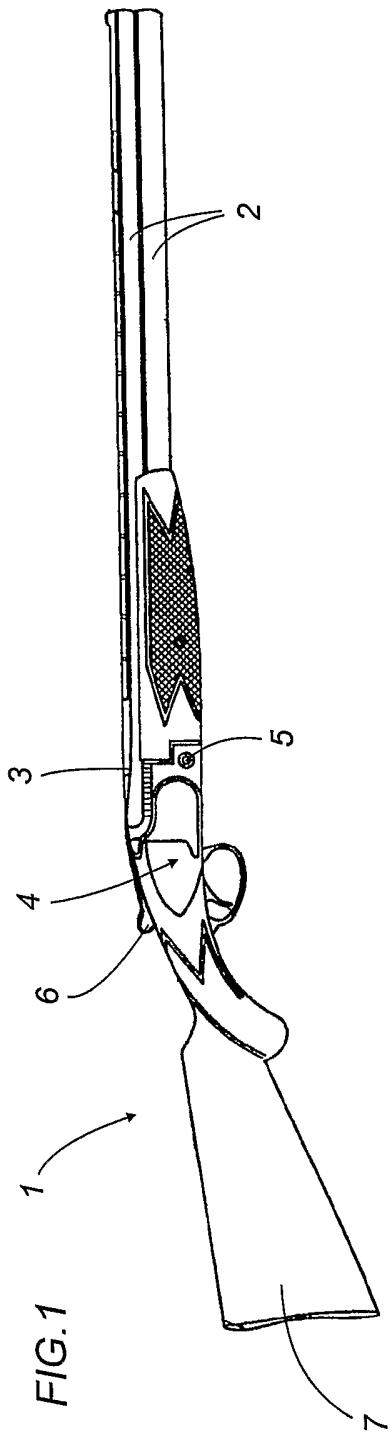


FIG.3

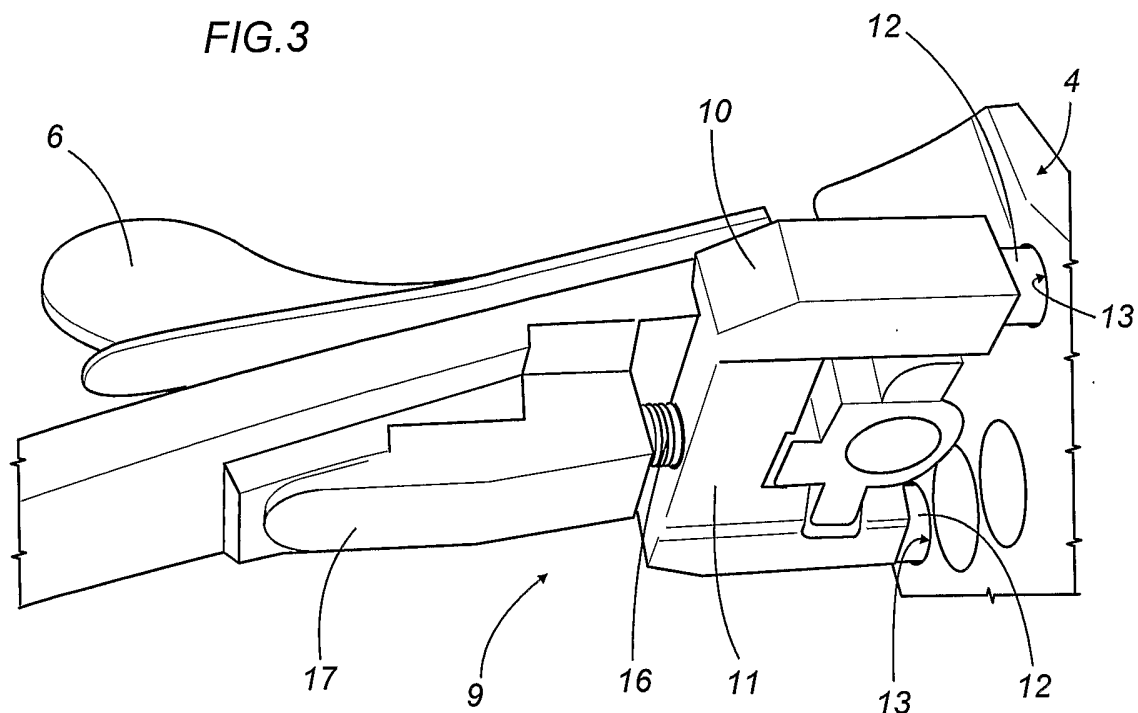


FIG.4

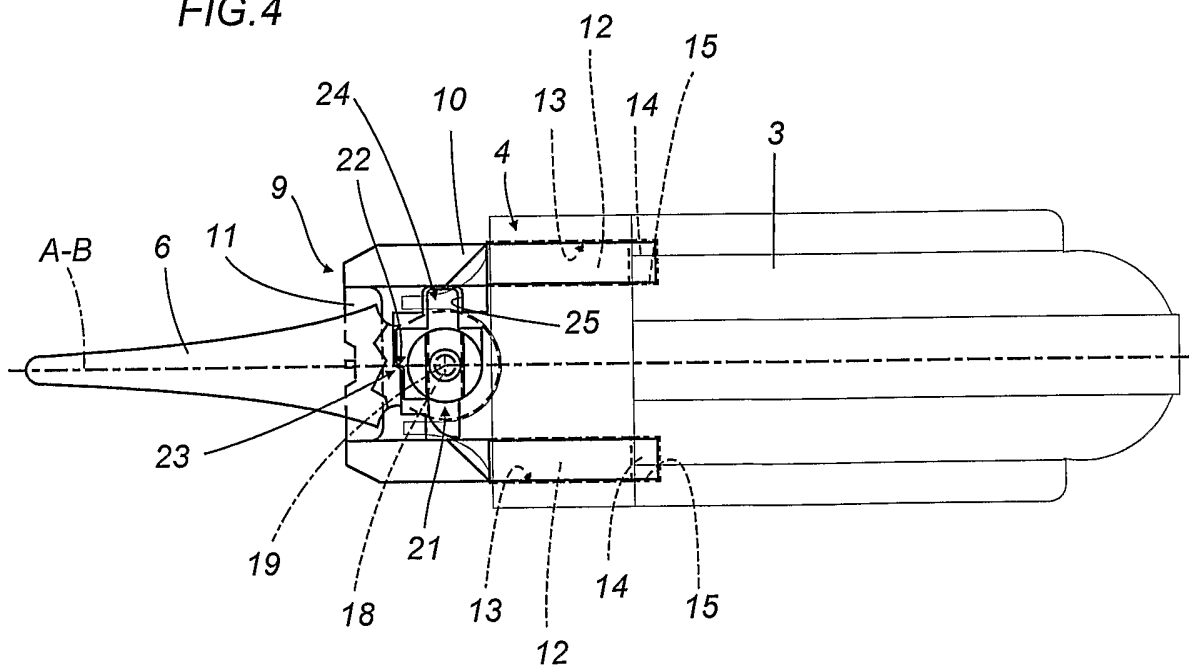


FIG.5

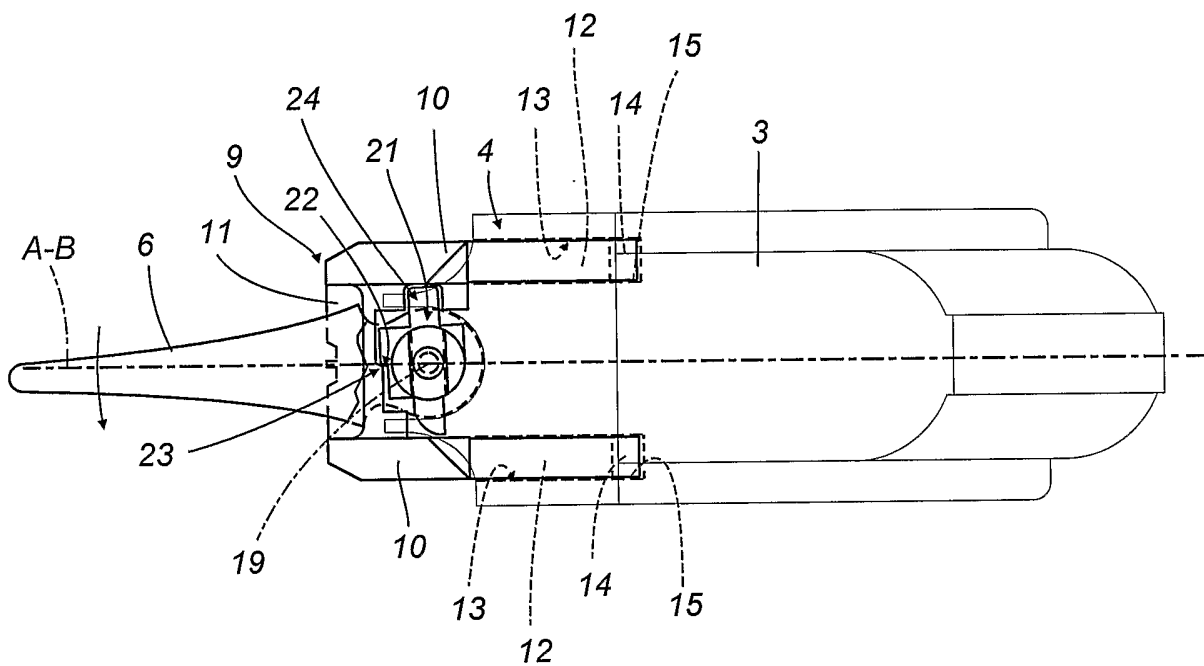
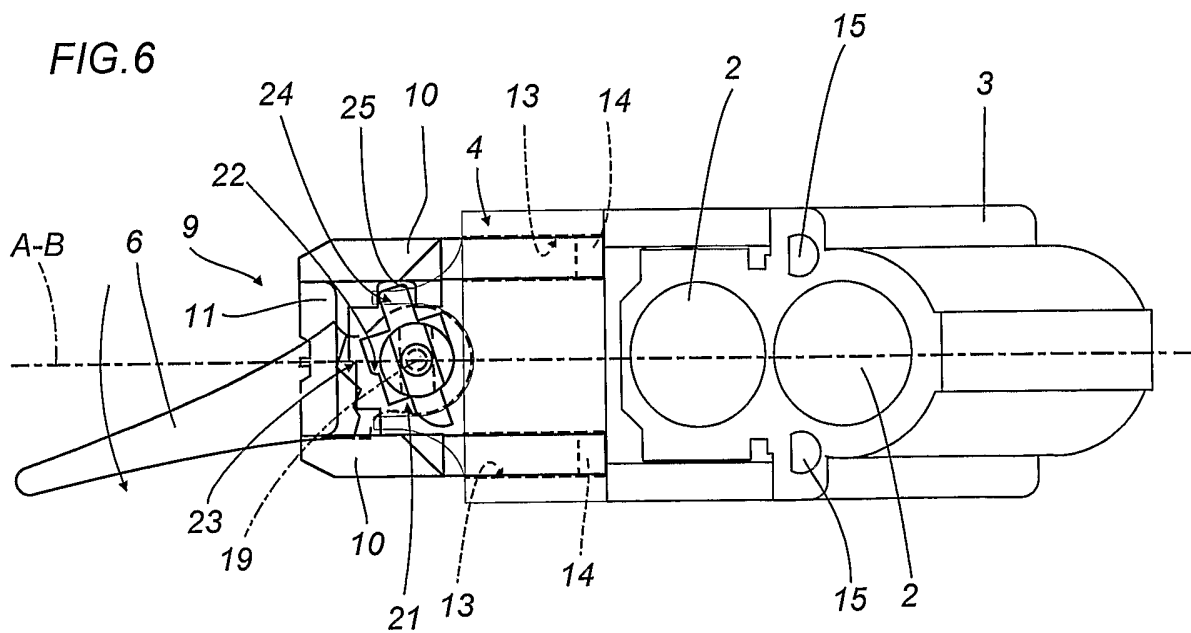


FIG.6



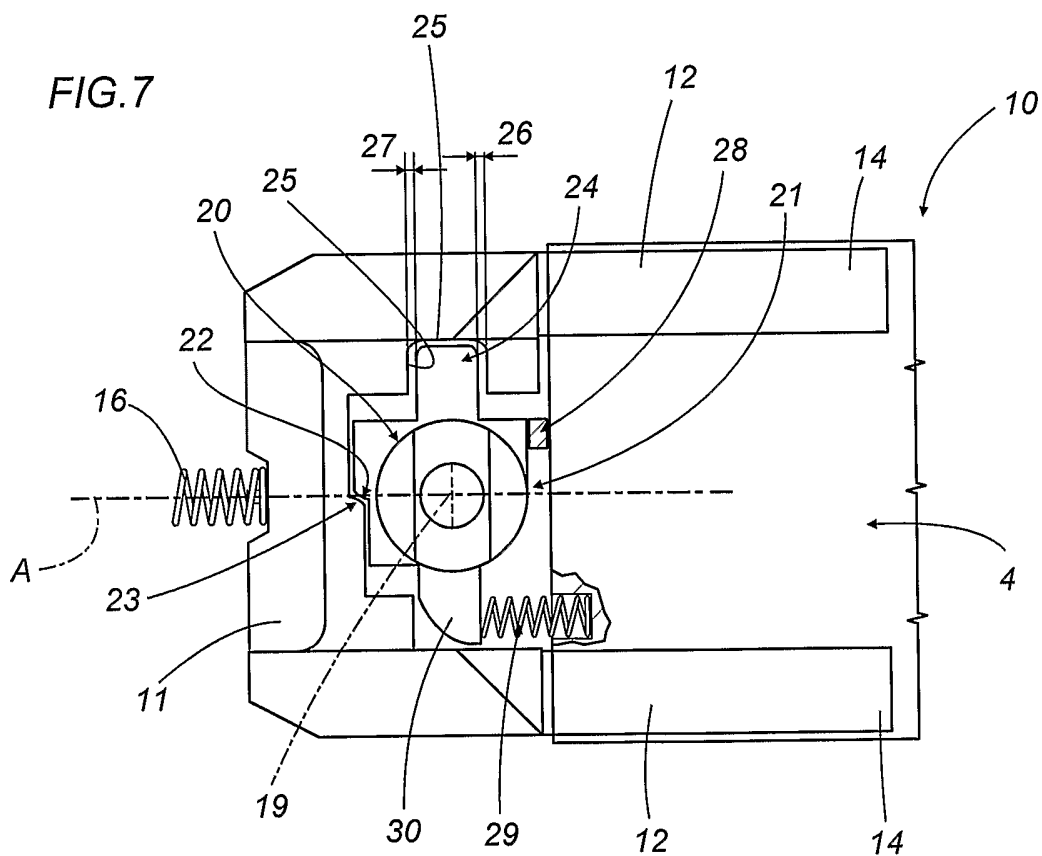


FIG.8

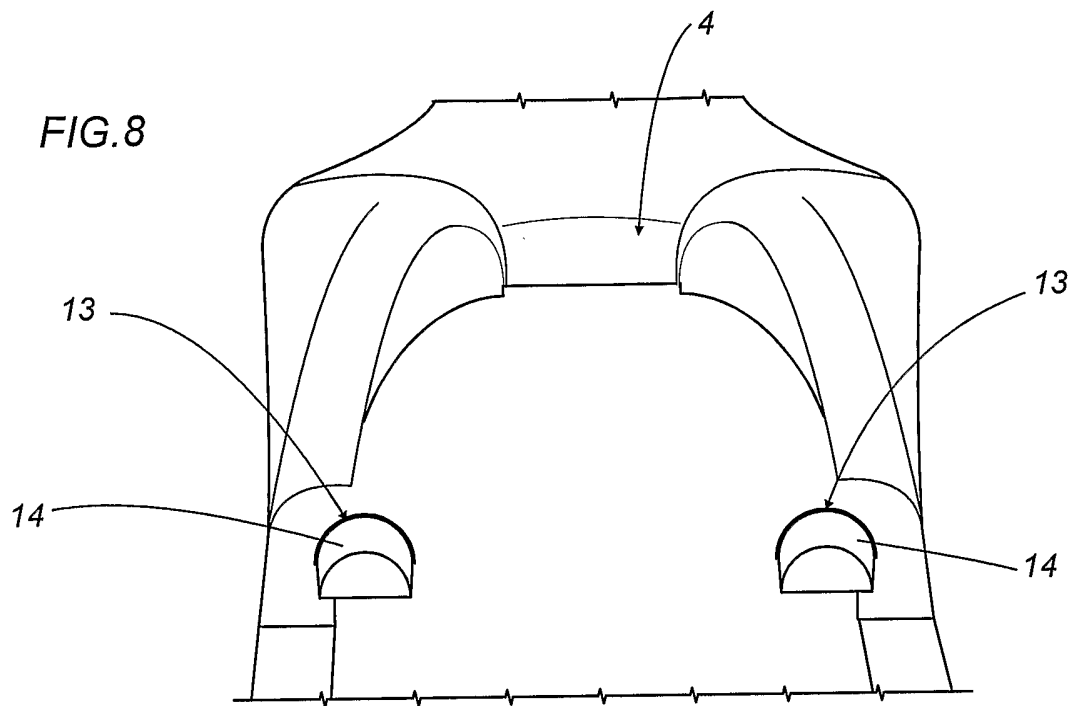
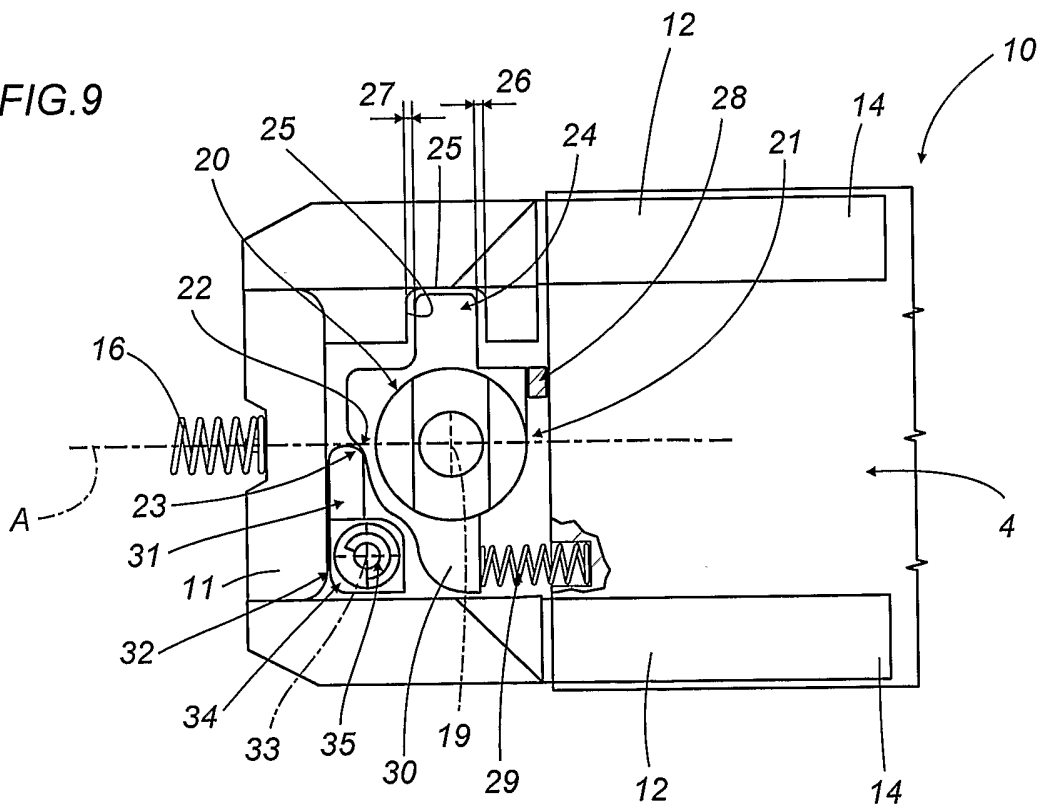


FIG.9



INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2005/001177

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F41A3/58

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F41A

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 095 297 A (STIENNON) 12 October 1937 (1937-10-12)	1-3, 6-9, 15-18
Y	column 2, line 9 - column 5, line 12 figures 1-9	10-12
Y	----- DE 27 44 402 A1 (AB SERVATOR) 12 April 1979 (1979-04-12) page 12, line 6 - page 13, line 20 figure 8	10-12
A	----- US 5 111 607 A (BLASER ET AL) 12 May 1992 (1992-05-12) abstract column 3, lines 27-68 figure 3	
	----- -/--	

Further documents are listed in the continuation of box C. Patent family members are listed in annex.

° Special categories of cited documents :

<p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p>	<p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>*G* document member of the same patent family</p>
--	--

Date of the actual completion of the international search 2 September 2005	Date of mailing of the international search report 09/09/2005
--	---

Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Menier, R
--	--

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2005/001177

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2 683 947 A (HOLT) 20 July 1954 (1954-07-20) column 3, lines 1-16 column 4, lines 6-15 column 5, lines 1,2 column 6, line 73 - column 8, line 66 figures 7,10 -----	
A	US 3 636 646 A (DREVET) 25 January 1972 (1972-01-25) abstract column 2, lines 17-58 figures 2-7 -----	
A	BE 900 065 A1 (FABRIQUE NATIONALE DE HERSTAL EN ABREGE FN S.A) 3 January 1985 (1985-01-03) the whole document -----	
A	GB 1 556 732 A (VERNEY CARRON SA) 28 November 1979 (1979-11-28) page 4, lines 34-51 figures 12-16 -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/IB2005/001177

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2095297	A	12-10-1937 NONE	
DE 2744402	A1	12-04-1979 NONE	
US 5111607	A	12-05-1992	DE 4000817 A1 18-07-1991 DE 59008435 D1 23-03-1995 EP 0437738 A2 24-07-1991 FI 910153 A 14-07-1991 JP 3071474 B2 31-07-2000 JP 4297794 A 21-10-1992
US 2683947	A	20-07-1954 NONE	
US 3636646	A	25-01-1972	DE 1916617 A1 16-07-1970 FR 95645 E 15-02-1971 US 3800455 A 02-04-1974
BE 900065	A1	03-01-1985	AU 4300485 A 09-01-1986 JP 61024998 A 03-02-1986 PT 80753 A ,B 01-08-1985
GB 1556732	A	28-11-1979	FR 2325893 A1 22-04-1977 BE 846522 A1 17-01-1977 BE 858591 A4 02-01-1978 DE 2642101 A1 07-04-1977 DE 2748390 A1 11-05-1978 ES 451861 A1 01-11-1977 FR 2370254 A2 02-06-1978 GB 1590096 A 28-05-1981 IT 1072552 B 10-04-1985